

PTO/SB/08A (07-05)

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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

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Sheet 1 of 13

Complete if Known

Application Number	10/802,160
Filing Date	03/17/2004
First Named Inventor	Jennifer Stone-Sundberg
Art Unit	1775
Examiner Name	Stephen J. Stein
Attorney Docket Number	1075-BI4309

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
TMS	A1	US- 3,753,775	08/21/1973	Robinson et al.	
	B1	US- 3,964,942	06/22/1976	Berkenblit et al.	
	C1	US- 4,649,070	03/10/1987	Kondo et al.	
	D1	US- 4,657,754	04/14/1987	Bauer et al.	
	E1	US- 5,643,044	07/01/1997	Lund	
	F1	US- 5,742,026	04/21/1998	Dickinson, Jr. et al.	
	G1	US- 5,989,301	11/23/1999	Laconto, Sr. et al.	
	H1	US- 6,048,577	04/11/2000	Garg	
	I1	US- 6,238,450 B1	05/29/2001	Garg et al.	
	J1	US- 6,258,137 B1	07/10/2001	Garg et al.	
	K1	US- 6,265,089 B1	07/24/2001	Fatemi et al.	
	L1	US- 6,364,920 B1	04/02/2002	Garg et al.	
	M1	US- 6,391,072 B1	05/21/2002	Garg	
	N1	US- 6,406,769 B1	06/18/2002	Delabre	
	O1	US- 6,418,921 B1	07/16/2002	Schmid et al.	
	P1	US- 2001/0026950 A1	10/04/2001	Sunakawa et al.	
	Q1	US- 2002/0028314 A1	03/07/2002	Tischler et al.	
	R1	US- 2002/0030194 A1	03/14/2002	Camras et al.	
TMS	S1	US- 2003/0190770 A1	10/09/2003	Yeom et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ⁶
		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				
TMS	T1	CN 1291795	04/18/2001	Guanglei Sci & Tech Co. Ltd.	English Abstract Only	
	U1	CN 1379484	11/13/2002	Univ Qinghua	English Abstract Only	
	V1	CN 1469459	01/21/2004	Fudi Elect. Mat. Co. Ltd.	English Abstract Only	
	W1	CN 1476046	02/18/2004	Shanghai Prec. Opt. Instr	English Abstract Only	
	X1	CN 1476047	02/18/2004	Shanghai Prec. Opt. Instr	English Abstract Only	
	Y1	EP 997445	05/03/2000	Corning Inc.	English Abstract Only	

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Sheet 2 of 13**Complete if Known**

Application Number	10/802,160
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Examiner Name	Stephen J. Stein
Attorney Docket Number	1075-BI4309

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		Number-Kind Code ² (if known)			
<i>TMS</i>	A2	US- 2003/0213950 A1	11/20/2003	Hwang	
<i>TMS</i>	B2	US- 2004/0063236 A1	04/01/2004	Kwak et al.	
<i>TMS</i>	C2	US- 2004/0089220 A1	05/13/2004	Kokta et al.	
	D2	US-			
	E2	US-			
	F2	US-			
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<i>TMS</i>	T2	EP 1298709	04/02/2003	NGK Insulators Ltd.	English Abstract Only	
	U2	EP 1394867	03/03/2004	Samsung Elect. Co. Ltd.	English Abstract Only	
	V2	JP 53-043481	04/19/1978	Matsushita Elec Ind. Co. Ltd.	English Abstract Only	
	W2	JP 79-026873	09/06/1979	Nippon Elect. Co.	English Abstract Only	
	X2	JP 58-090736	05/30/1983	Tokyo Shibaura Elect. Co.	English Abstract Only	
<i>TMS</i>	Y2	JP 61-142759	06/30/1986	NGK Spark Plug Co. Ltd.	English Abstract Only	

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Sheet **3** of **13****U. S. PATENT DOCUMENTS**

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	B3	US-			
	C3	US-			
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	N3	US-			
	O3	US-			
	P3	US-			
	Q3	US-			
	R3	US-			
	S3	US-			

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		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				
MS	T3	JP 62-123059	06/04/1987	Narumi Seito KK	English Abstract Only	
	U3	JP 7-235692	09/05/1995	Sony Corp.	English Abstract Only	
	V3	JP 8-040797	02/13/1996	Kyocera Corp.	English Abstract Only	
	W3	JP 8-083802	03/26/1996	Shingijutsu Kigyodan	English Abstract Only	
	X3	JP 8-095233	04/12/1996	Tono Seiki YG	English Abstract Only	
MS	Y3	JP 9-129651	05/16/1997	Hewlett-Packard Co.	English Abstract Only	

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Sheet 4 of 13

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Art Unit	1775
Examiner Name	Stephen J. Stein
Attorney Docket Number	1075-BI4309

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	N4	US-			
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	P4	US-			
	Q4	US-			
	R4	US-			
	S4	US-			

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		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				
745	T4	JP 9-129928	05/16/1997	Toshiba KK	English Abstract Only	
	U4	JP 11-195813	07/21/1999	Toshiba Denshi Eng. KK	English Abstract Only	
	V4	JP 11-235659	08/31/1999	Ricoh KK	English Abstract Only	
	W4	JP 11-274559	10/08/1999	Sanyo Elect. Co. Ltd.	English Abstract Only	
	X4	JP 2000-228367	08/15/2000	Samsung Elect. Co. Ltd.	English Abstract Only	
746	Y4	JP 2000-331940	11/30/2000	Sony Corp.	English Abstract Only	

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Sheet **5** of **13****Complete if Known**

Application Number	10/802,160
Filing Date	03/17/2004
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	A5	US-			
	B5	US-			
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	E5	US-			
	F5	US-			
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	R5	US-			
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TMS	T5	JP 2001-010898	01/16/2001	NEC Corp.	English Abstract Only	
	U5	JP 2001-198808	07/24/2001	Morioka Seiko Kogyo KK	English Abstract Only	
	V5	JP 2001-220295	08/14/2001	Namiki Seimitsu Hoseki KK	English Abstract Only	
	W5	JP 2001-253800	09/18/2001	Namiki Seimitsu Hoseki KK	English Abstract Only	
	X5	JP 2002-012856	01/15/2002	Neos KK	English Abstract Only	
TMS	Y5	JP 2002-050577	02/15/2002	Namiki Seimitsu Hoseki KK	English Abstract Only	

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	Q6	US-			
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	S6	US-			

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		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				
MAP	T6	JP 2002-158377	05/31/2002	Matsushita Denki Sangyo KK	English Abstract Only	
	U6	JP 2002-255694	09/11/2002	Kyocera Corp.	English Abstract Only	
	V6	JP 2002-353425	12/06/2002	Kyocera Corp.	English Abstract Only	
	W6	JP 2003-045829	02/14/2003	Hitachi Chem Co. Ltd.	English Abstract Only	
	X6	JP 2003-113000	04/18/2003	Hitachi Cable Ltd.	English Abstract Only	
MAC	Y6	JP 2003-124151	04/25/2003	Disco KK	English Abstract Only	

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	Q7	US-			
	R7	US-			
	S7	US-			

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	X7	JP 2003-338638	11/28/2003	Nichia Kagaku Kogyo KK	English Abstract Only	
JMS	Y7	JP 2004-006867	01/08/2004	Matsushita Denki Sagyo KK	English Abstract Only	

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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet **8** of **13****Complete if Known**

Application Number	10/802,160
Filing Date	03/17/2004
First Named Inventor	Jennifer Stone-Sundberg
Art Unit	1775
Examiner Name	Stephen J. Stein
Attorney Docket Number	1075-BI4309

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
	A8	US-			
	B8	US-			
	C8	US-			
	D8	US-			
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	F8	US-			
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	N8	US-			
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				
MS	T8	JP 2004-014691	01/15/2004	Mitsubishi Gas Chem Co Inc.	English Abstract Only	
	U8	JP 2004-140394	05/13/2004	Nissan Chem Ind. Ltd.	English Abstract Only	
	V8	KR 2002-043128	06/08/2002	Ulsan College	English Abstract Only	
	W8	SU 1781271	12/15/1992	Krasy Poly (Kypo)	English Abstract Only	
	X8	TW 550836	09/01/2003	Ind. Tech. Res. Inst.	English Abstract Only	
MS	Y8	WO 2000/68332	11/16/2000	MPM Ltd.	English Abstract Only	

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Sheet 9 of 13

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Examiner Name	Stephen J. Stein
Attorney Docket Number	1075-B14309

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	A9	US-			
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	D9	US-			
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	M9	US-			
	N9	US-			
	O9	US-			
	P9	US-			
	Q9	US-			
	R9	US-			
	S9	US-			

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		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				
TMJ	T9	WO 2002/92674	11/21/2002	US Sec of Navy	English Abstract Only	
TMJ	U9	WO 2004/33769	04/22/2004	Unisearch Ltd.	English Abstract Only	
	V9				English Abstract Only	
	W9				English Abstract Only	
	X9				English Abstract Only	
	Y9				English Abstract Only	

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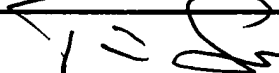
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Complete if Known

Sheet	10	of	13	Application Number	10/802,160
				Filing Date	03/17/2004
				First Named Inventor	Jennifer Stone-Sundberg
				Art Unit	1775
				Examiner Name	Stephen J. Stein
				Attorney Docket Number	1075-BI4309

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
TMS	A10	Aeschlimann, R. et al., "The Chemical Polishing of Magnesium Aluminate Spinel in Pyrophosphoric Acid", MAT. RES. BULL., Vol. 5, pgs 167-172, 1970.	
	B10	Dwikusuma, F., "Study on Sapphire Surface Preparation for III-Nitride Heteroepitaxial Growth by Chemical Treatments", JOURNAL FOR ELECTROCHEMICAL SOC., Nov. 2002, 30 pgs.	
	C10	Kim, S. et al., "Stress Relaxation in Thick-Film GaN Grown by Hydride Vapor Phase Epitaxy on Sapphire and Spinel Substrates as Studied by Photoluminescence and Raman Spectroscopy", J. OF THE KR PHYS SOC., Vol. 34, No. 2, Feb. 1999, pgs 163-167.	
	D10	Kurobe, Toshiji, et al., "Magnetic Field-Assisted Lapping", BULL. JAPAN SOC. OF PREC. ENGG., Vol. 20, No. 1, March 1986, pgs 49-51.	
	E10	Libowitzky, E., "Optical Anisotropy in the Spinel Group: a Polishing Effect", EUR. J. MINERAL., Vol. 6, 1994, pgs. 187-194.	
	F10	Reisman, A., et al., "The Chemical Polishing of Sapphire and MgAl Spinel", J. ELECTROCHEM. SOC.: SOLID STATE SCIENCE, Vol. 118, No. 10, October 1971, pgs 1653-1657.	
	G10	Richter, F., et al., "Herstellung und Ausrichtung Von MgAl-Spinell-Substraten fur die Halbleiterepitaxie", KRISTALL UND TECHNIK, Vol. 10, No. 3, 1975, pgs 33-348.	
	H10	Robinson, P., et al., "The Chemical Polishing of Sapphire and Spinel", RCA REVIEW, Vol. 34, December 1973, pgs 616-629.	
	I10	Roy, D., et al., "Spinel, Where did it go?", SPIE Vol. 3134, pgs 307-316.	
TMS	J10	Wang, C., et al., "Growth and Characterization of Spinel Single Crystal for Substrate Use in Integrated Electronics", J. APPLIED PHYSICS, Vol. 40, No. 9, August 1969, pgs 3433-3444.	

Examiner Signature		Date Considered	06/06
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Application Number	10/802,160
		Filing Date	03/17/2004
		First Named Inventor	Jennifer Stone-Sundberg
		Art Unit	1775
		Examiner Name	Stephen J. Stein
Sheet 11 of 13	Attorney Docket Number	1075-BI4309	

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
TMS	A11	Yanina, S., et al., "Moving Steps and Crystal Defects on Spinel Surfaces", MAT. RES. SOC. SYMP., Vol. 620, 2000, pgs M9.4.1-M9.4.6.	
	B11	Byun, D., et al., "Reactive ion (N2+) Beam Pretreatment of Sapphire for GaN Growth", THIN SOLID FILMS, Vol. 326, 1998, pgs 151-153.	
	C11	Byun, D., et al., "New Pretreatment Method of Sapphire for GaN Deposition", PHYS. STAT. SOL., Vol. 176, 1999, pgs 643-648.	
	D11	Sung, Y., et al., "High Rate Etching of Sapphire Wafer Using Cl2BCl3Ar Inductively Coupled Plasmas", MAT. SCI. & ENG.: SOLID STATE MAT, Vol. B82, No. 1-3 2000, pgs 50-52. (ABSTRACT ONLY)	
	E11	Wang, X., et al., "Chemical Polishing of Sapphire for Growth of GaN", CHINESE JOURNAL OF SEMICONDUCTORS, Vol. 18, No. 11, pgs 867-871, 1997. (ABSTRACT ONLY)	
	F11	Lee, J., et al., "Scribing and Cutting a Blue LED Wafer Using a Q-Switched Nd:YAG Laser", APPLIED PHYSICS, Vol. 70, No. 5, pgs 561-564, 2000. (ABSTRACT ONLY)	
	G11	Kalinski, Z., "Preparation of Sapphire Substrates for Gas Phase GaN Epitaxial Processes", KRISTAL UND TECHNIK, Vol. 12, No. 10, pgs 1105-1110, 1977. (ABSTRACT ONLY)	
	H11	Jeong, C., et al., "Sapphire Etching with BCl3/HBr/Ar Plasma", SURFACE & COATINGS TECHNOLOGY, Vol. 171, No. 1-3, 2003, pgs 280-284. (ABSTRACT ONLY)	
	I11	Kalinski, Z., et al., "Structural Etching of Al2O3 Substrate Plates Applied in Gaseous Epitaxy of GaN Layers", ELEKTRONIKA, Vol. 18, No. 3, 1977, pgs 117-119. (ABSTRACT ONLY)	
TMS	J11	Lakew, B., et al., "High Tc Superconducting Bolometer on Chemically Etched 7 Micrometer Thick Sapphire", NASA, 1997, 21 pgs. (ABSTRACT ONLY)	

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			Examiner Name	Stephen J. Stein	
Sheet	12	of	13	Attorney Docket Number	1075-BI4309

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TMS	A12	Jeong, C., et al., "Dry Etching of Sapphire Substrate for Device Separation in Chlorine-Based Inductively Coupled Plasmas", MAT. SCI. & ENG.: SOLID STATE MATERIALS, Vol. 93, No. 1-3, pgs 60-63, 2002. (ABSTRACT ONLY)	
	B12	Gu, E., et al., "Micromachining and Dicing of Sapphire, Gallium Nitride and Micro LED Devices with UV Copper Vapour Laser", THIN SOLID FILMS, Vol. 453-454, pgs 462-466, 2000. (ABSTRACT ONLY)	
	C12	Park, H., et al., "A Novel Process for the Generation of Pristine Sapphire Surfaces", THIN SOLID FILMS, Vol. 422, No. 1-2, pgs 135-140, 2000. (ABSTRACT ONLY)	
	D12	Fenner, D., et al., "Ion Beam Nanosmoothing of Sapphire and Silicon Carbide Surfaces", SPIE, Vol. 4468, pgs 17-24, 2001. (ABSTRACT ONLY)	
	E12	Blecha, Z., et al., "On Fabrication of Sapphire Substrates (1102) for Epitaxy of Monocrystalline Silicon", JEMNA MECHANIKA A OPTIKA, Vol., 28, No. 12, pgs 249-351, 1983. (ABSTRACT ONLY)	
	F12	Duffy, M., et al., "Optical Characterization of Silicon and Sapphire Surfaces as related to SOS Discrete Device Performance", JOURNAL OF CRYSTAL GROWTH, Vol. 58, No. 1, pgs 19-36, 1982. (ABSTRACT ONLY)	
	G12	Ehman, M., et al., "Mechanical Preparation of Sapphire Single-Crystal Surfaces by Vibratory Techniques", METALLOGRAPHY, Vol. 9, No. 4, pgs 333-339, 1976. (ABSTRACT ONLY)	
	H12	Druminiski, M., et al., "Deposition of Epitaxial Films on Spinel and Sapphire. Influence of Substrate Preparation", SIEMENS FORSCHUNGS - UND ENTWICKLUNGSBERICHTE, Vol. 5, No. 3, pgs 139-145, 1976. (ABSTRACT ONLY)	
	I12	Cullen, G., "The Preparation and Properties of Chemically Vapor Deposited Silicon on Sapphire and Spinel", JOURNAL OF CRYSTAL GROWTH, Vol. 9, pgs 107-125, 1971. (ABSTRACT ONLY)	
TMS	J12	Liu, L., et al., "Substrates for Gallium Nitride Epitaxy", MAT. SCI. & ENG. REPORTS, Vol. R37, No. 3, pgs 61-127, 2000. (ABSTRACT ONLY)	

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		Examiner Name	Stephen J. Stein		
Sheet	13	of	13	Attorney Docket Number	1075-BI4309

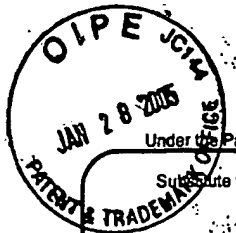
NON PATENT LITERATURE DOCUMENTS			
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TMS	A13	Khattak, C., et al., "Production of Sapphire Blanks and Substrates for Blue LEDs and LDs", MAT. RES. SOC. SYMP. - PROCEEDINGS, V. 743, pgs 219-224, 2002. (ABSTRACT ONLY)	
	B13	Gutsche, H., et al., "Polishing of Sapphire with Colloidal Silica", JOURNAL OF THE ELECTROCHEMICAL SOCIETY, Vol. 125, No. 1, 1978, pgs 136-138, 1978. (ABSTRACT ONLY)	
	C13	Duffy, M., et al., "Semiconductor Measurement Technology: Method to Determine the Quality of Sapphire, (NOTE) Final Report", RCA Labs, 1980, 77 pgs. (ABSTRACT ONLY)	
	D13	Duffy, M., et al., "Method to Determine Quality of Sapphire, (NOTE) Interim Rept.", RCA Labs, 1975, 88 pgs. (ABSTRACT ONLY)	
	E13	Horie, S., et al., "Precision Grinding of Semiconductor - Related Materials", (JOURNAL) NEW DIAMOND, Vol. 20, No. 2, pgs 8-13, 2004. (ABSTRACT ONLY)	
	F13	Edgar, J., et al., "Substrates for Gallium Nitride Epitaxy", MAT. SCI. & ENG., PART R, Vol. R37, No. 3, pgs 61-127, 2002. (ABSTRACT ONLY)	
	G13	Author Unknown, "Specifications for Polished Monocrystalline Sapphire Substrates" 1996, Affiliation (Issuing Organization) SEMI Semiconductor Equipment & Materials International, USA. (Bibliographic Entry Only).	
TMS	H13	Search Report for Technical Articles (Including various Abstracts of certain Identified References)	
	I13		
	J13		

Examiner Signature		Date Considered	06/06
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Filing Date	March 17, 2004
First Named Inventor	Jennifer Stone-Sundberg
Art Unit	2812
Examiner Name	UNASSIGNED
Attorney Docket Number	1035-BI4309

Sheet 1 of 3

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TMS	AA	US- 4,963,520	10/16/1990	Yoo, et al.	
	AB	US- 5,982,796	11/09/1999	Kokta, et al.	
	AC	US- 5,654,973	08/05/1997	Stultz, et al.	
	AD	US- 5,557,624	09/17/1996	Stultz, et al.	
	AE	US- 6,366,596	04/02/2002	Yin, et al.	
TMS	AF	US- 6,023,479	02/08/2000	Thony, et al.	
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	AQ	US-			
	AR	US-			
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ⁶
		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				
	AT					
	AU					
	AV					
	AW					
	AX					
	AY					

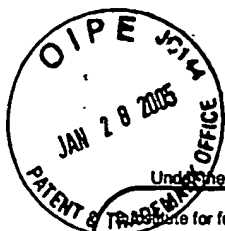
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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Complete if Known

Application Number	10/802,160
Filing Date	March 17, 2004
First Named Inventor	Jennifer Stone-Sundberg
Art Unit	2812
Examiner Name	UNASSIGNED
Attorney Docket Number	1035-BI4309

Sheet 2 of 3

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
TMS	BA	Efimov, A.N., et al., "Onan Unusual Azimuthal Orientation Relationship in the System Gallium Nitride Layer on Spinel Substrate", CRYSTALLOGRAPHY REPORTS, 45(2): 312-317 (2000).	
	BB	Sun C.J., et al., "Mg-doped green light emitting diodes over cubic (1 1 1) MgAl ₂ O ₄ substrate", APP. PHYS. LETT. 72(19): 2361-2363 (1998).	
	BC	Efimov, A.N., et al., "Symmetry constraints and epitaxial growth on non-isomorphic substrate", THIN SOLID FILMS 260: 111-117 (1995).	
	BD	George, T., et al., "Novel symmetry in the growth of gallium nitride on magnesium aluminate substrates", APPL. PHYS. LETT. 68(3): 337-339 (1996).	
	BE	Sun C.J., et al., "Deposition of high quality wurtzite GaN films over cubic (1 1 1) MgAl ₂ O ₄ substrates using low pressure and metalorganic chemical vapor deposition," APPL. PHYS. LETT. 68(8): 1129-1131 (1996).	
	BF	Nakamura, S., et al., "Characteristics of InGaN multi-quantum-well-structure laser diodes," APPL. PHYS. LETT. 68(23): 3269-3271 (1996).	
	BG	Khan, M.A., et al., "Cleaved cavity optically pumped InGaN-GaN laser grown on spinel substrates," APPL. PHYS. LETT. 69(16): 2418-2420 (1996).	
	BH	Tempel, A., et al., "Nachweis von Stapelfehlern in GaN-Exitaxieschichten mittels Elektronenbeugung," KRISTALL UND TECHNIK 10(7): 741-746 (1975).	
	BI	Tempel, A., et al., "Zur Epitaxie von Galliumnitride auf nichtstoechiometrischem Spinell im System GaC1/NH3/He," KRISTALL UND TECHNIK 10(7): 747-758 (1975)	
TMS	BJ	K.V. Yumashev, "Saturable absorber Co ²⁺ : MgAl ₂ O ₃ crystal for Q switching of 1.34-um Nd ³⁺ : YAlO ₃ and 1.54-um Er ³⁺ : glass lasers," APPLIED OPTICS 38(30): 6343-6346 (1999).	

Examiner Signature	<i>Justin R. Spier</i>	Date Considered	06/06
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TMS	CA	Camargo, M.B., et al., "Co2+ Y3Sc2Ga3O12 (YSGG) Passive Q-Switch for Infared Erbium Lasers," submitted to LEOS in 1994.	
	CB	Mikhailov, V.P., et al., "Passive Q-switch performance at 1.3u (1.5u) and nonlinear spectroscopy of Co2+: MgAl2O4 and Co2+: LaMgAl11O9 crystals," OSA TOPS VOL. 26 Advanced Solid-State Lasers, pp. 317-324 (1999).	
	CC	Stulz, R.D., et al., "Divalent Uranium and Cobalt Saturable Absorber Q-Switches at 1.5um," OSA Proceedings on Advanced Solid-State Lasers, 24:460-464 (1995).	
	CD	Bimbaun, M., et al., "Co2+: ZnSe Saturable Absorber Q-Switch for the 1.54 um Er3+: Yb3+: Glass Laser," OSA TOPS Vol. 10 Advanced Solid State Lasers, pp. 148-151 (1997).	
	CE	Machida, H., et al., "difficulties encountered during the Czochralski growth of TiO2 single crystals," JOURNAL OF CYRSTAL GROWTH, 112: 835-837 (1997).	
	CF	Camargo, M.B., et al., "Broad-band 1.54 um Saturable Absorber Q-switch with Co2+, " submitted to ASSL in 1995.	
	CG	Yumashev, K.V., et al., "Nonlinear spectroscopy and passive Q-switching operation of a Co2+: LaMgAl11O19 crystal," J. OPT. SOC. AM. B., 16(12): 2189-2194 (1999).	
	CH		
U	CI		
TMS	CJ		

Examiner
Signature

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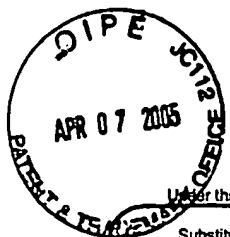
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Examiner Name	UNASSIGNED
Attorney Docket Number	1035-BI4309

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		Number-Kind Code ² (if known)			
TMS	AA	US- 3,625,868	12/07/1971	Grabmaier et al.	
	AB	US- 3,736,158	05/29/1973	Cullen et al.	
	AC	US- 3,816,906	06/18/1974	Falckenberg	
	AD	US- 3,883,313	05/13/1975	Cullen et al.	
	AE	US- 3,885,978	05/27/1975	Doi et al.	
	AF	US- 3,990,902	11/09/1976	Nishizawa, et al.	
	AG	US- 3,950,504	04/13/1976	Belding et al.	
	AH	US- 4,370,739	01/25/1983	Wang et al.	
	AI	US- 4,755,314	07/05/1988	Sakaguchi et al.	
	AJ	US- 5,138,298	08/11/1992	Shino	
	AK	US- 5,850,410	12/15/1998	Kuramata	
	AL	US- 6,533,874 B1	03/18/2003	Vaudo et al.	
	AM	US- 2003/0188678 A1	10/09/2003	Kokta et al.	
	AN	US- 6,839,362 B2	01/05/2005	Kokta et al.	
	AO	US- 6,844,084 B2	01/18/2005	Kokta et al.	
TMS	AP	US- 3,424,955	01/28/1969	Seiter et al.	
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	AR	US-			
	AS	US-			

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		Country Code ³ Number ⁴ Kind Code ⁵ (if known)				
TMS	AT	FR 1,471,976	03/24/1966	Siemens Aktiengesellsc.	Corr. 3,424,955	
	AU	JP 11-157997	06/15/1999	Kyocera Corporation	Abstract Only	
	AV	JP 09-278595	10/28/1997	Sumitomo Elect. Ind. Ltd.	Abstract Only	
	AW	JP 62-188325	08/17/1987	Sumitomo Elect. Ind. Ltd.	Abstract Only	
	AX	JP 58-211736	12/09/1983	Toshiba Corporation	Abstract Only	
TMS	AY	JP 07-307316	11/21/1995	Sumitomo Elect. Ind. Ltd.	Abstract Only	

Examiner Signature	<i>Jennifer Stone-Sundberg</i>	Date Considered	4/04
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Sheet 2 of 3**Complete if Known**

Application Number	10/802,160
Filing Date	March 17, 2004
First Named Inventor	Jennifer Stone-Sundberg
Art Unit	2812
Examiner Name	UNASSIGNED
Attorney Docket Number	1035-BI4309

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	BJ	US-			
	BK	US-			
	BL	US-			
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MUC	BT	EP 0 762 930 B1	07/12/2000	BP Amoco Corporation		
	BU	EP 0 263 171 B1	11/25/1992	UOP		
	BV	WO 01/99155 A2	12/27/2001	Nichia Corporation		
MUC	BW	WO 02/95887 A2	11/28/2002	SG Ceramics & Plastics Inc.		
	BX					
	BY					

Examiner Signature	<i>Indy Sen</i>	Date Considered	06/06
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First Named Inventor	Jennifer Stone-Sundberg
Art Unit	2812
Examiner Name	UNASSIGNED
Attorney Docket Number	1035-BI4309

Sheet 3 of 3

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TMS	CA	Giess et al., "Growth of Single Crystal MgGa ₂ O ₄ Spinel", IBM TECHNICAL DISCLOSURE BULLETIN, Vol. 15, no. 1, June 1972, pgs 151-152, XP-002315746.	
	CB	Anon., "Spinel Crystals for Electronic Devices", MANUFACTURING TECHNOLOGY NOTE, Vol. NTN-77, no. 0735, April 1977, XP-002315747.	
	CC	Grabmaier et al., "Czochralski Growth of Magnesium-Aluminum Spinel", J. AMERICAN CERAMIC SOCIETY, Vol. 51, no. 6, June 1968, pgs 355-356, XP-002315185.	
	CD	Wyon et al., "Czochralski Growth and Optical Properties of Magnesium-Aluminum Spinel Doped with Nickel", JOURNAL OF CRYSTAL GROWTH, NORTH-HOLLAND PUBLISHING CO. AMSTERDAM, NL, Vol. 79, no. 1-3, part 2, 1986, pgs 710-713, XP-002250057.	
	CE	Pinckney, L.R., "Transparent, high strain point spinel glass-ceramics", JOURNAL OF NON-CRYSTALLINE SOLIDS, Vol. 255, pp. 171-177, 1999.	
	CF	Nakamura, S. "Current Status and Future Prospects of InGa _N -Based Laser Diodes", ISAP INTERNATIONAL, Vol. 1, pgs. 5-17, 2000.	
	CG	Kisailus D., et al., "Growth of Epitaxial GaN of LiGaO ₂ Substrates Via a Reaction With Ammonia", J. MATER. RES., Vol. 16, no. 7, pgs 2077-2081, 2001.	
	CH	Nakamura, S., et al., "InGa _N MQW LDs Grown on MgAl ₂ O ₄ Substrates," In THE BLUE LASER DIODE, (NY: Springer-Verlag), pp. 233-243, 1997 (update included).	
TMS	CI	Mordoc, H., et al., "Large-band-gap SiC, III-V nitride, and II-VI ZnSe-based Semiconductor Device Technologies", J. APPL. PHYS., Vol. 76, no. 3, pgs 1363-1398, 1994.	
	CJ		

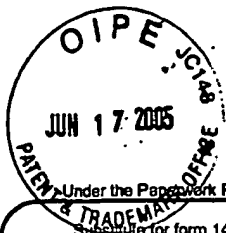
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7MS	A	US- 3,808,065	04-30-1974	Robinson, et al.	
	B	US- 3,898,051	08-05-1975	Schmid	
	C	US- 4,347,210	08-31-1982	Maguire, et al.	
7MS	D	US- 5,968,267	10-19-1999	Li	
	E	US-			
	F	US-			
	G	US-			
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	L	US-			
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	X					
	Y					

Examiner Signature	<i>Wendy B. Stone</i>	Date Considered	06/06
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STATEMENT BY APPLICANT**

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Complete if Known

Application Number	10/802,160
Filing Date	March 17, 2004
First Named Inventor	Jennifer Stone-Sundberg
Art Unit	1775
Examiner Name	Stephen J. Stein
Attorney Docket Number	1075-BI4309


Sheet 1 of 1

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
JMS	A	US- 6,846,434 B2	01/25/2005	Aksetrod	
	B	US- RE38,489 E	04/06/2004	Thony et al.	
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			
	N	US-			
	O	US-			
	P	US-			
	Q	US-			
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ⁶
		Country Code ² Number ² Kind Code ³ (if known)				
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Examiner Signature		Date Considered	06/06
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Substitute for form 1449/PTO

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Application Number NEW APPLICATION
Filing Date HEREWITH
First Named Inventor Jennifer Stone-Sundberg
Attorney Docket Number 1035-BI4309

Sheet 1 of 3
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U.S. PATENT DOCUMENTS

Examiner Initials *	Cite No. 1	U.S. Patent Document Number	Kind Code 2 (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
TMS	AA	3,655,439		SEITER	04/11/1972	
	AB	3,658,586		WANG	04/25/1972	
	AC	3,796,597		V.R. PORTER, et al.	03/12/1974	
	AD	4,177,321		NISHIZAWA	12/04/1979	
	AE	5,741,724		RAMDANI, et al.	04/21/1998	
	AF	5,850,410		KURAMATA	12/15/1998	
	AG	5,530,267		BRANDLE, JR., et al.	06/25/1996	
	AH	6,104,529		BRANDLE, JR., et al.	08/15/2000	
	AI	3,883,313		CULLEN, et al.	05/13/1975	
	AJ	5,802,083		BIRNBAUM	09/01/1998	
TMS	AK	2003/0007520	A1	KOKTA, et al.	01/09/2003	

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TMS	AL	EP	0 148 656	A1	AUZEL, et al.	11/16/1984		<input type="checkbox"/>
	AM							<input type="checkbox"/>

PUBLICATIONS

Examiner Initials *	Cite No. 1	Title of Publication	Date of Publication of Cited Document MM-DD-YYYY
TMS	AV	YUMASHEV K.V., et al., "Co ²⁺ -doped spinels saturable absorber Q-switches for 1.3-1.6 μ m solid state lasers", OSA TRENDS IN OPTICS AND PHOTONICS. ADVANCED SOLID STATE LASERS., Vol. 34, pp. 236-239, 2000. XP008017966	
	AW	YUMASHEV, K.V., et al., "Passive Q-switching of 1.34- μ m neodymium laser using Co ²⁺ :LiGa ₅ O ₈ and Co ²⁺ :MgAl ₂ O ₄ ", CONFERENCE DIGEST, 2000, 1 page. XP002242959	
	AX	OKTYABRSKY, S., et al., "Crystal structure and defects in nitrogen-deficient GaN", MRS Internet J. Nitride Semicond. Res, G6.43, pp. 1-6, 1999.	
	AY	KLEBER, W., et al., "Zur epitaxie von galliumnitrid auf nichtstochiometrischem spinell im system GaC/NH ₃ /He", CRYSTAL RESEARCH AND TECHNOLOGY, Vol. 10, No. 7, pp. 747-758, 1975. (English Abstract)	
TMS	AZ	SEIFERT, A., "Nachweis von stapelfehlern in GaN-epitaxieschichten mittels elektronenbeugung", CRYSTAL RESEARCH AND TECHNOLOGY, Vol. 10, No. 7, pp. 741-746, 1975. (English Abstract)	
Examiner Signature	<i>Jennifer Stone-Sundberg</i>		Date Considered 06/06

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1 Unique citation designation number. 2 See attached Kinds of U.S. Patent Documents. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 If possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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TMS	BA	6,533,874	B1	VAUDO, et al.	03/18/2003	
	BB	4,627,064		AUZEL, et al.	12/02/1986	
	BC	4,000,977		FALCKENBERG	01/04/1977	
	BD	4,493,720		Gauthier, et al.	01/15/1995	
	BE	5,644,400		Mundt	07/01/1997	
	BF	5,768,335		Shahid	06/16/1998	
	BG	5,825,913		Rostami, et al.	10/20/1998	
	BH	5,822,213		Huynh	10/13/1998	
	BI	6,021,380		Fredriksen, et al.	02/01/2000	
	BJ	4,819,167		Cheng, et al.	04/04/1989	
TMS	BK					

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	BL							<input type="checkbox"/>
	BM							<input type="checkbox"/>

PUBLICATIONS

Examiner Initials *	Cite No. 1	Title of Publication	Date of Publication of Cited Document MM-DD-YYYY
TMS	BW	OHSATO, H., et al., "Epitaxial orientation and a growth model of (0 0 • 1) GaN thin film on (1 1 1) spinel substrate", JOURNAL OF CRYSTAL GROWTH, Vol. 189/190, pp. 202-207, 1998.	
	BX	YANG, H. -F., et al., "Microstructure evolution of GaN buffer layer on MgAl ₂ O ₄ substrate", JOURNAL OF CRYSTAL GROWTH, Vol. 193, pp. 478-483, 1998.	
	BY	DUAN, S., et al., "MOVPE growth of GaN and LED on (1 1 1) MgAl ₂ O ₄ ", JOURNAL OF CRYSTAL GROWTH, Vol. 189/190, pp. 197-201, 1998.	
TMS	BZ	SHELDON, R., et al., "Cation Disorder and Vacancy Distribution in Nonstoichiometric Magnesium Aluminate Spinel, MgO • Al ₂ O ₃ ", J. AM. CERAM. SOC., Vol. 82, No. 12, pp. 3293-3298, 1999.	
Examiner Signature	Jennifer Stone-Sundberg		Date Considered 06/06

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Sheet 3 of 3

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PUBLICATIONS

Examiner Initials *	Cite No. 1	Title of Publication	Date of Publication of Cited Document MM-DD-YYYY
7AS	AAA	KULESHOV, N.V., et al. "Co-doped spinels: promising materials for solid state lasers", LONGER WAVELENGTH LASERS AND APPLICATIONS, Vol. 2138, pp. 175-182, 1994. XP008017848	
	AAB	KULESHOV, N.V., et al., "Absorption and luminescence of tetrahedral Co ²⁺ ion in MgAl ₂ O ₄ , Vol. 55, no. 5-6, pp. 265-269, 1993. XP008017849	
	AAC	NIKISHIN, S.A., et al., "Gas source molecular beam epitaxy of GaN with hydrazine on spinel substrates", APPLIED PHYSICS LETTERS, Vol. 72, No. 19, pp. 2361-2363, 1998. XP000755963	
	AAD	HAISMA, et al., "Lattice constant adaptable crystallographics", JOURNAL OF CRYSTAL GROWTH, Vol. 102, pp. 979-993, 1990. XP002250056	
	AAE	TAMURA, K., et al., "Epitaxial growth of ZnO film on lattice-matched ScaMgO ₄ (0001) substrates", JOURNAL OF CRYSTAL GROWTH, Vol. 214-215, pp. 59-62, 2000. XP004200964	
	AAF	WYON, et al., "Czochralski growth and optical properties of magnesium-aluminum spinel doped with nickel", JOURNAL OF CRYSTAL GROWTH, Vol. 79, pp. 710-713, 1986. XP002250057	
	AAG	TSUCHIYA, T., et al. "Epitaxial growth of InN films on MgAl ₂ O ₄ (1 1 1) substrates", JOURNAL OF CRYSTAL GROWTH, Vol. 220, pp. 185-190, 2000.	
	AAH	KURAMATA, Akito, et al., "High-quality GaN epitaxial layer grown by metalorganic vapor phase epitaxy on (111) MgAl ₂ O ₄ substrate", APPL. PHYS. LETT., Vol. 67, No. 17, pp. 2521-2523, 1995.	
	AAI	MITCHELL, T., "Dislocations and Mechanical Properties of MgO- MgAl ₂ O ₃ spinel single crystals", J. AM. CERAM. SOC., Vol. 82, No. 12, pp. 3305-3316, 1999.	
	AAJ	HELLMAN, E., "Exotic and Mundane substrates for gallium nitride heteroepitaxy", BELL LABORATORIES, THC2, Murray Hill, NJ.	
	AAK	KRUGER, M.B., et al., "Equation of state of MgAl ₂ O ₄ spinel to 65 GPa", THE AMERICAN PHYSICAL SOCIETY, Vol. 58, No. 1, pp. 1-4, 1997.	
	AAL	KURAMATA, A., et al., "Properties of GaN epitaxial layer grown on (111) MgAl ₂ O ₄ substrate", SOLID-STATE ELECTRONICS, Vol. 41, No. 2, pp. 251-254, 1997.	
7AS	AAM	GRITSYNA, V., et al., "Structure and Electronic states of defects in spinel of different compositions MgO • n MgAl ₂ O ₃ :Me", J. AM. CERAM. SOC. Vol. 82, No. 1, pp. 3365-3373, 1999.	
Examiner Signature	[Signature]		Date Considered 06/06

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